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Quality in Teacher Education
A Crisis Revisited

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The Western Interstate Commission for Higher Education

WICHE, the Western Interstate Commission for Higher Education, is a nonprofit regional organization dedicated to helping fourteen western states to work together to provide high-quality, cost-effective programs to meet the education and manpower needs of the region. Member states are Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming; North Dakota is an affiliated state. Through its Information Clearinghouse, which produced this report, WICHE provides information to higher education and government officials as they address important policy issues in the West.

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Foreword

Our educational system has been under intense scrutiny in recent years, with a good deal of criticism directed toward the quality of instruction in elementary and secondary schools. The number of reports and recommendations on educational excellence has reached flood stage. It is recognized that the delivery of quality education is inextricably related to the quality of the teaching work force. Success in improving the former is dependent on improving the latter.

Why another report now? What is its value? The Western Interstate Commission for Higher Education (WICHE) has spent more than a year gathering and synthesizing information on the problems facing education and relating them to teacher training. Teacher education is an area in which higher education faculty, administrators, and state government policy makers can have direct impact on the quality of education.

This report brings together information, concepts, and findings in teacher education, and identifies examples of changes and initiatives to improve the profession. WICHE directs this report to those with the capacity to make a difference in education's ultimate outcome. It is WICHE's hope and expectation that those involved will take the necessary steps toward a substantial improvement in the quality of teacher education. Our future will be better for it.

April 1985

Phillip Sirotkin
Executive Director
Western Interstate Commission
for Higher Education

Executive Summary

Excellence in education is dependent upon high quality teaching. Currently, much of the national dissatisfaction with the quality of education is directed toward the quality of instruction provided in the public schools. The formal education and practical preservice and inservice training that teachers receive through colleges and universities is crucial to the level of educational excellence ultimately provided in the schools. Other reforms in the educational system will mean little if the quality of teaching does not also improve.

Teacher education institutions are attempting to modernize their programs to stress greater quality, although the variety of changes indicates a lack of consensus on the most effective way to educate teachers. Major initiatives being undertaken by schools of education include:

- Strengthening admission, retention, and graduation standards,
- Changing program structures and updating obsolete curricula,
- Increasing use of new educational technologies in teacher training,
- Extending training beyond the traditional four years of college and providing more preservice practical experience for student teachers,
- Improving inservice training for teachers in the field, as well as training other professionals to be teachers, and
- Engaging in more cooperative activities with the schools and state agencies.

Despite such initiatives, a number of formidable obstacles must be overcome before the teaching work force is improved significantly. A central problem is the need to attract high-quality students into teaching and retain the best teachers in the profession. Teacher education continues to enroll a disproportionately large share of students with low academic abilities, and

that situation has been worsening. Attempts to tighten entrance and graduation standards threaten to inflame the already startling decline in the numbers of students entering teaching.

Fewer students are seeking to become teachers, and those who do enter teaching leave it more rapidly than do professionals in other fields. This fact is most true of the best qualified teachers. Low salaries, poor working conditions, lack of status, few opportunities for advancement, and expanded career opportunities in other professions are among the reasons cited for this exodus.

An often overlooked determinant in improving the quality of instruction is the availability of jobs for teachers. Following previous oversupplies, there now is a rough balance nationally between teacher supply and demand. Differences do exist among localities and regions, however, and there are significant shortages of teachers in some fields. Projections generally indicate that as elementary school enrollments increase through this decade, there will be widespread shortages. Unless more and better qualified persons enter teaching, the many qualitative efforts now in progress may fall by the wayside as pressures increase to fill a growing number of teacher vacancies.

A number of entities are involved in the multifaceted problem of quality teaching--schools of education, their governing authorities, local school districts and individual schools, professional associations, agencies for certification and accreditation, legislatures, and others. The cooperation of many will be required to devise successful strategies to meet short-term teacher shortages while increasing standards and incentives for quality teaching over the long run.

Introduction

The quality of education has become an increasingly visible issue in American public policy in the past decade. Few other public enterprises affect so many people directly or consume so many tax dollars. In the 1982-83 school year, forty million children between five and seventeen years of age were enrolled in 86,500 public elementary and secondary schools in 15,641 school districts (100, 159). More than two million teachers were employed in the public schools, at an average annual salary of $20,531 (100). Total expenditures by federal, state, and local governments equaled about $117 billion in 1982-83; over 90 percent of those revenues were provided by state and local governments (157, 159, 185).

At the same time, enrollments in public elementary and secondary schools have declined about 14 percent from their peak in 1971-72 (100, 151). As a result, total expenditures for education from kindergarten through high school (K-12) declined slightly in constant dollars from 1972-73 to 1982-83, although expenditures per pupil increased about 22 percent in that decade (100).

Despite--or perhaps because of--this huge investment in public education, the quality of schooling has become a national concern. This concern has generated widespread political debate, reports of many commissions and task forces, and other studies of public elementary and secondary education.

Declining test scores of public school pupils often are cited as evidence of the diminishing quality of education. While some of the decline in test scores is due to a broader range of students now taking the tests, critics argue that some of the decline reflects lower scholastic achievement. Poor preparation of high school students is shown in the large numbers of remedial courses offered at the postsecondary level. The National Center for Education Statistics reports sharp increases in remedial college courses since 1978, with 25 percent of 1983-84 college freshmen enrolled in remedial mathematics, 16 percent in remedial reading, and 21 percent in remedial writing courses.

This decline in performance has contributed to deteriorating public confidence in K-12 public education: sixty-three percent of the people interviewed in a 1982 Gallup poll gave the nation's public schools grades of C, D, or F (178).

Much of the dissatisfaction with the public schools lies in the quality of instruction provided to pupils. The public is questioning the competence of schoolteachers, who receive between one-third and one-half of all K-12 expenditures. Another Gallup poll in 1979 found that a majority of respondents, when asked what schools have to do to earn the public's respect, replied, "Improve the quality of teachers" (229). High quality education depends upon high quality teaching; other reforms will mean little if teaching does not also improve (225).

At the same time it is recognized that, as Ernest Boyer puts it, "We ask a great many different things of our schools, and often fail to provide them with the resources to fulfill our expectations" (28, p. 2). Similarly, the congressionally-appointed Merit Pay Task Force admonishes that "too often we as a people have failed to adequately finance our schools, and then criticized them for not training students as we had hoped" (16, p. 1).

Scope of the Report

This report focuses on the education teachers receive before and after they are employed in the classroom, the standards by which they are evaluated, the environment within which they work, and the future supply and demand for teachers--factors that will help determine the ultimate success of efforts to improve the quality of instruction in our schools.

In addressing teacher quality, there is a need to examine the education of and standards for teachers, as well as their supply, demand, and employment conditions. If teaching cannot attract sufficient numbers of qualified candidates, efforts to improve teaching will meet with limited success.

The Western Interstate Commission for Higher Education (WICHE) is focusing on teacher education for the following reasons:

- WICHE's primary concern is higher education, where teacher preparation takes place. The states are concerned about the quality of teacher education and recognize that the time has come to take action.

- Most recommendations to improve teaching involve the application of incentives and controls after teachers graduate from college (e.g., salary increases, career ladders, and more stringent certification standards). These approaches are important, but they do not address all problems of teacher quality. Teachers need to be better prepared if they are to teach better.

- Colleges and universities often blame poor student performance on inadequate elementary and secondary education. This shifting of blame fails to recognize that schoolteachers and administrators are themselves products of the higher education system (110).

Chapter 1 discusses common problems in preservice teacher education. Chapter 2 describes some changes that higher education institutions across the country have made to improve teacher preparation. Chapter 3 discusses competency testing and inservice education as ways of promoting quality teaching. Chapter 4 discusses teacher supply and demand, as well as reasons for the difficulties in attracting an adequate supply of qualified teacher candidates and suggestions for overcoming those difficulties. A brief concluding note in Chapter 5 completes the report.

The appendix summarizes the findings of several prominent commissions and task forces related to teacher education, quality, and supply and demand.*

Finally, an extensive selected bibliography is provided, including the specific references cited numerically in the text.

* Reports and recommendations continue to be issued. As this report went to press (April 1985), the National Commission for Excellence in Teacher Education, an independent commission established by the American Association of Colleges for Teacher Education, issued A Call for Change in Teacher Education and a report on teacher education policy in the fifty states; and the Educational Testing Service had just released a report entitled The Impact of State Policy on Entrance into the Teaching Profession.

1. Problems in Teacher Education

Teacher quality lies at the core of the educational process. As Maeroff notes, "The level of instruction can be no better than the people to whom it is entrusted" (148, p. 28). While many factors contribute to the deterioration of public education, recent reports cite problems in the preparation of teachers (209). Improving teacher training is essential to improving education (139, 205).

The rhetoric of recent reports spotlights these concerns. Boyer characterizes instruction as "at times inspired, occasionally dreadful, and, most often, routine" (58, p. 15-16). Goodlad finds teachers operating within constraints that emphasize their "own talk and the monitoring of seatwork" (116, p. 467). The Twentieth Century Fund finds teacher competence and commitment far short of expectations, and the Task Force on Education for Economic Growth of the Education Commission of the States describes a "gap between our need for highly qualified teachers and our supply of them" (206, p. 25; 207).

Mounting evidence casts doubts on the competence of many new teacher graduates:

- Large proportions of teacher candidates (as many as 40 percent in some states) fail state-mandated competency tests on their first try.
- Many studies have shown that teaching disproportionately attracts students with low academic ability and fails to attract those with high ability.
- Not only are students who choose to major in education less academically qualified than other students, but the gap between them is widening.
- Studies have shown that the most academically able education graduates are the least likely to go into teaching; of those who do go into teaching, the more academically able are the most likely to leave within a few years.

Deficient teacher training has contributed to declining teacher quality: teachers themselves may be the victims of an educational process that does not prepare them adequately (25, 58, 61, 64, 102, 113, 137, 163, 196, 204). Critics argue that in view of the ever-increasing demands placed on teachers, the education they receive (in both subject area and pedagogy) has become obsolete, "transform(ing) the first several years of teaching into on-the-job training" (200, p. 20; 128). Since higher education institutions are "both producers of teachers and consumers of their products," the future of higher education is closely tied to the future of the public schools (224, p. 1; 58, 208). Improving preservice teacher education is the primary way in which higher education can upgrade instruction in the public schools, and there are significant contributions that higher education can make to inservice education for teachers as well.

Lack of Support for Teacher Education

A general lack of concern on the part of higher education for elementary and secondary education "is at the heart of the nationwide education crisis," Harding and Spurlin contend (122, p. 16). Andrews argues that there are sufficient human and fiscal resources to permit colleges and universities to prepare competent teachers, but questions why they so often fail to do this (42, p. 49).

The reasons are numerous. Teacher education programs are often constrained by limited funding, staff, and facilities (72, 128, 135). Corrigan states that "teacher education today attempts to do too much with too little, and it is funded at the lowest level of any professional education program in the United States" (71, p. 6). On the basis of a 1982 teacher education funding survey, Peseau questions "whether our teacher education programs have resources sufficient to prepare teachers who meet society's expectations" (177, p. 3). The relative and absolute funding of teacher education programs is decreasing at the very time demand is escalating and teacher education faces higher expectations for quality (177). In 1983, a congressionally appointed Merit Pay Task Force recommended that colleges and universities increase institutional support for teacher education (16).

At most institutions, teacher education programs generate over 10 percent of student credit hours, although the programs receive less than 3 percent of the institutions' resources (71, 202). Most teacher education programs are

allotted only one-fourth of the revenue they produce. On the average, professors of education earn $5,000 less than their colleagues in other disciplines (131). Universities spend an average $2,363 per full-time equivalent student, but only $927 per student in teacher education (176). Annually, less is spent per pupil to educate a teacher than to educate a typical third grader ($1,400) (176).

University funding formulas generally do not recognize the "labor-intensive nature of the clinical and supervisory components of undergraduate (teacher education) programs, the extra demands on faculty associated with evening and off-campus instruction, or the proportion of field service carried on by education faculty compared with those in other academic units" (85, p. 38). Enrollments in teacher education programs have dropped significantly in the past decade, leading to a reduction in resources allocated on the basis of FTE enrollments. Many colleges of education have lowered their standards in order to maintain enrollments or diverted their resources to more lucrative programs, such as graduate education and inservice training (87, 189).

Partly because of these funding constraints, teacher education programs have found it difficult to keep up with the expanding knowledge base on effective teaching (26, 127, 143). They lack the resources to accommodate new technological developments and increased demands placed on teachers by new state and federal requirements (72, 113). While other professions have increased their practice standards and depth of training, teacher education has remained virtually unchanged for the past fifty years (72, 137, 204).*

As a result of these factors, "there can be no doubt that many...teacher education programs are in disarray. Too often they are staffed by persons who are neither scholars nor outstanding teachers" (127, p. 1, 112). In turn, teacher education programs have suffered a loss of respect within the university that parallels what the public schools have suffered in the community.

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*Some states and schools implemented competency-based teacher education (CBTE) programs in the 1960s and 1970s. However, the CBTE movement was largely a renaming of the old curriculum, and has faded in recent years (137).

Allegations of mediocrity have made it difficult for colleges of education to obtain a greater share of university resources (137, 203). University leaders have often failed to recognize higher education's responsibility toward teacher education. This, in essence, has resulted in diverting both intellectual resources and high quality students from teacher education programs (112). So while many teacher education programs have engaged in extensive self-assessment in recent years, "all too often the results are mostly on paper, with little payoff to the students in the program" (201, p. 26). What changes have been made have often been piecemeal modifications of existing programs, rather than major reconceptualizations reflecting new expectations and changing demands (38).

Structure, Content, and Coordination Problems

Problems in the structure and content of teacher training that contribute to declining teacher quality are the following:

- Teacher education programs have relatively low standards for admission and graduation.
- Curricula have not kept up with advancing knowledge about teaching and learning, changing student needs, or educational technology developments.
- Field experience is often limited and inadequate.
- Relationships between colleges of education and colleges of arts and sciences are poor. Teacher candidates may receive inadequate training in both subject matter and pedagogy.
- Teacher education programs are often poorly coordinated with the public schools and state and local education agencies. Teacher candidates are often not prepared to do what the public schools require of them.

Each of these issues is discussed below.

Admission and Graduation Standards. Many teacher education programs have relatively unselective admission and graduation requirements. Moreover, the entering qualifications of teacher education majors have declined substantially in recent years (16, 58, 72, 113, 128, 141, 158, 197, 198, 203, 204, 205). One study found that most programs accept over 90 percent of the students who apply for admission, many of whom have weak general education

backgrounds and inadequate basic skills (141, 198). Graduation requirements tend to be lax, as well, and critics argue that few quality controls are exercised during the training process (72, 128, 203). Dropping enrollments, declining applicant quality, and threatened financial cutbacks have caused some programs to lower their standards even further in order to maintain enrollments (25, 204, 205).

Studies have repeatedly shown that the most academically able students do not enter teacher education programs. Students enrolling in these programs tend to be in the bottom one-third of their high school graduating classes. Their scores on standardized tests such as the Scholastic Aptitude Test (SAT), American College Testing Program (ACT), and Graduate Record Examination (GRE) are among the lowest of all college majors (25, 64, 137, 163, 171, 172, 204, 205, 206, 211). The National Longitudinal Study of 1972 high school seniors showed that teaching disproportionately attracts students with low measured academic ability, and fails to attract those with high ability (216). College Entrance Examination Board data show that in 1982 students intending to major in education ranked thirty-third in SAT scores out of thirty-six possible fields of study (99). A National Institute of Education study found that only 7.9 percent of the college graduates in the top one-fifth of SAT scores went into teaching, while 28 percent of those in the bottom one-fifth entered the field (99). Another study found that "30 percent of all teachers are drawn from the lower 20 percent of academic achievement. And 34 percent of teachers committed to remain in teaching come from the lower 20 percent--61 percent from the lower 40 percent" (54, p. 12).

Not only are students who choose to major in education less academically qualified than other majors, but the gap between them is widening (64, 178, 188). For example, in 1970-71 the average SAT scores of teacher education majors exceeded the national mean, but by 1975-76, their scores were well below the national average (137). Since the early 1970s, SAT scores of prospective teachers have dropped twice as fast as the national average (61, 163, 203, 204, 205). Table 1 shows that verbal SAT scores of students planning to major in education decreased 18.9 percent between 1973 and 1980, and mathematics SAT scores decreased 6.9 percent. During the same period, the national averages declined only 4.7 percent and 3.1 percent, respectively. The drop in verbal scores is particularly noteworthy: education majors were more than three times farther behind the national average in 1980 than in 1973. Scores

of teacher education majors are also falling faster than the national average on the Graduate Record Examination, and scores of new teacher graduates on the National Teacher Examination (NTE) have fallen steadily since 1969 (163, 203, 204, 205).

Table 1

Average SAT Scores of Education Majors Compared to the National Average, 1973 and 1980

Verbal

	1973	1980	Percent Change
National Average	445	424	-4.7%
Education Majors	418	339	-18.9
Difference	27	85	--

Mathematics

	1973	1980	Percent Change
National Average	481	466	-3.1
Education Majors	449	418	-6.9
Difference	32	48	--

Source: Gary Sykes, Teacher Preparation and the Teacher Workforce: Problems and Prospects for the Eighties, 1981.

Not only do schools of education attract less qualified students, but they also fail to demand quality performance from their students. A study by the Southern Regional Education Board, for example, found that arts and sciences graduates who had provisional or temporary teaching certificates outscored teacher education graduates on general and professional education tests, even though the tests were weighted toward professional education content (70). In part because of doubts about the competence of new teacher graduates, many states have instituted proficiency or competency tests as a requirement for certification. These tests usually measure basic skills in mathematics, reading, and writing. Nevertheless, a surprisingly large proportion of candidates fail the tests on their first try. In 1983, almost 35 percent of recent teaching graduates seeking new credentials and 43 percent of teachers seeking permanent credentials or certification in new subject areas

failed California's competency test (64). Failure rates in other states have ranged from 14 percent in Florida to 47 percent in Louisiana (126, 187). While critics argue that measured academic ability is not necessarily related to teaching ability, effective performance in teaching would seem to require a capacity to understand and transmit knowledge (216).

In addition to failing to attract the most academically able students, teaching also is characterized by a high attrition rate; teachers scoring highest on academic ability and achievement tests tend to leave the profession earliest (204). Twenty percent of the most academically able teachers leave after their first year, and nearly all of this group leave within five years (61, 64, 78, 171). Teachers with low academic ability are far more likely to remain in teaching (216).

In some states, standards for admission to and graduation from teacher education programs are legislatively mandated, while in others they are set by the institutions (104, 137, 197). Critics argue that state education agencies sometimes approve inadequate teacher education programs and fail to evaluate them on a regular basis (113, 187, 196). Professional standards and accreditation systems that can only recommend program changes, rather than require them, may also perpetuate deficient programs (58, 137, 204).

Research on Teaching and Learning. In recent years, a great deal of research has been devoted to the skills teachers need to be effective in the classroom (98, 135, 142, 229). Many experts maintain that little of that knowledge has been incorporated into teacher education curricula in an informed and consistent manner (25, 72, 98, 135, 142, 218, 229). Some educators argue that teacher training has not changed to reflect greater pupil diversity, the infusion of social problems into the schools, and broader expectations concerning the functions of public education (218, 219). Many times teachers serve handicapped students and students from varying racial, cultural, linguistic and social backgrounds. Experimental programs, such as magnet schools, are underway; yet teacher training curricula often have little relevance to these new conditions (72).

Teaching Methods. Teacher education does not sufficiently recognize alternatives to the lecture-based teaching method. Teacher candidates do not always learn how to use innovative techniques or how to apply them to

different types of students (72, 116, 117, 144). Instead, teacher training programs tend to emphasize conventional models of style, practice, and form (116, 117). Even student teaching tends to reinforce a narrow range of traditional methods.

Educational Technology. Many teacher education programs fail to train teachers in the new educational technologies used in the public schools. The use of microcomputers has grown dramatically in the public schools: in 1982-83, approximately 27 percent of elementary schools, 46 percent of junior high schools, and 62 percent of high schools used microcomputers for instructional purposes (30). However, "the number of computers in the classroom is growing more rapidly than the number of teachers trained to use them" (42, p. 44; 30, 58, 99). Many teacher education programs do not require any computer-related courses (5, 99). A 1983 survey by the American Association of Colleges for Teacher Education's (AACTE) Task Force on Instructional Technology found that while four-fifths of responding institutions offered at least one degree or certification program in educational technology, only one-fifth required such courses for graduation (5). The National Education Association found that only 20 percent of teachers had any training in the use of computers (5). Teacher education programs "need to take full advantage of the information revolution, and link technology more effectively to teaching and learning in the schools" (58, p. 7; 42).

Field Experience. Goodlad and others argue that teacher education programs offer their students inadequate field experience with weak evaluation and feedback (25, 72, 102, 117, 119, 198, 203, 204). Consequently, students do not learn enough about a variety of different teaching methods and tend to end up "teaching as they were taught" (117, 119). Familiar, traditional models of teaching are perpetuated and innovation is discouraged (198). Many educators propose that field experience comprise a broad range of educational settings (as in the rotating internship in medical training), so students can explore a variety of instructional techniques (72, 76, 158). A few critics have advocated that the entire teacher education program be field-based; one study found that graduates of field-based programs were more satisfied with their training than graduates of campus-based programs (123).

Table 2 summarizes state requirements for student field experience. The majority of states require only one semester of student teaching or less, and very few require more than one placement (72, 100).

Relationships with Other Departments. Poor relationships between colleges of education and arts and sciences departments often result in inadequate training in both subject matter and pedagogy (25, 128, 144, 196). Education majors generally learn academic content independently from teaching methods, and they rarely study their disciplines with a view toward teaching them to children (25, 128, 144).

More broadly, many educators argue that a major problem facing teacher education programs is diffuse responsibility and accountability (143). While colleges of education are often blamed for the declining quality of new teacher graduates, the majority of teacher candidates' training occurs in the arts and sciences departments. Secondary education students spend only 30 percent of their time in the professional education school, and elementary education students less than 40 percent (25). Faculty of academic disciplines often fail to see their role in the preparation of new teacher graduates (42, 76, 128, 137, 144, 162). Moreover, professors in the college of education and in the arts and sciences departments often contend for the students' time. Those in academic disciplines maintain that too many professional courses are required at the expense of subject matter training, while education faculty frequently contend that the reverse is true (203, 220).

Coordination with the Public Schools. Teacher education programs are poorly coordinated with the public schools and state and local education agencies (37, 58, 148, 196, 204). Maeroff comments that "there is little effort to involve the schools in the one function of higher education--training teachers—that, in the end, affects them most profoundly" (148, p. 27). Few programs collect data on the success or failure of their graduates, which makes it difficult to implement changes in an informed manner (163, 196). As a result, theory and practice are weak, and teacher training is not always appropriate in terms of what the public schools need (135). Local schools and state education departments need to be involved in teacher

Table 2

Required Student Teaching in the States, 1983

State	Elementary Level		Secondary Level	
	Length	Number of Placements	Length	Number of Placements
Alabama	10 weeks	1	10 weeks	1
Alaska	varies	varies	varies	varies
Arizona	varies	varies	varies	varies
Arkansas	n/a	n/a	n/a	n/a
California	1 semester	n/a	1 semester	n/a
Colorado	1 semester	1-2	1 semester	1-2
Connecticut	6-12 sh	varies	6-12 sh	n/a
Delaware	15 weeks	1	15 weeks	1
Florida	8-12 weeks	1	8-12 weeks	1
Georgia	1 semester	1	1 semester	1
Hawaii	1 semester	1	1 semester	1
Idaho	8-12 weeks	2	8-12 weeks	2
Illinois	6-9 weeks	1	6-9 weeks	1
Indiana	1 semester	1	1 semester	1
Iowa	varies	1	varies	1
Kansas	8 weeks	n/a	8 weeks	n/a
Kentucky	8 weeks	n/a	12 weeks	n/a
Louisiana	n/a	1	n/a	1
Maine	varies	n/a	varies	varies
Maryland	8-12 weeks	1	8-12 weeks	1
Massachusetts	300 ch	1-2	300 ch	1-2
Michigan	10 weeks	1	10 weeks	1
Minnesota	varies	varies	varies	varies
Mississippi	6 weeks	1	6 weeks	1
Missouri	5 weeks	n/a	5 weeks	n/a
Montana	8-12 weeks	1	8-12 weeks	1
Nebraska	9 weeks	1	9 weeks	1
Nevada	1 semester	varies	1 semester	varies
New Hampshire	n/a	n/a	n/a	n/a
New Jersey	1 semester	varies	1 semester	varies
New Mexico	1 semester	1	1 semester	1
New York	8-12 weeks	1	8-12 weeks	1
North Carolina	180 ch	n/a	180 ch	n/a
North Dakota	8-12 weeks	1	8-12 weeks	1
Ohio	3 quarters	n/a	3 quarters	1
Oklahoma	1 semester	1	1 semester	1
Oregon	9 weeks	1	9 weeks	1
Pennsylvania	1 semester	1	1 semester	1
Rhode Island	n/a	n/a	n/a	n/a
South Carolina	n/a	n/a	n/a	n/a
South Dakota	8-12 weeks	1	8-12 weeks	1
Tennessee	6-9 weeks	1	6-9 weeks	1
Texas	8-12 weeks	1	8-12 weeks	1
Utah	1 semester	1	1 semester	1
Vermont	6 weeks	1	6 weeks	1
Virginia	120 ch	2+	120 ch	2+
Washington	6 weeks	1	6 weeks	1
West Virginia	n/a	n/a	n/a	n/a
Wisconsin	8 weeks	1	8 weeks	1
Wyoming	8 weeks	1+	n/a	1+

Source: C. Emily Feistritzer, The Condition of Teaching: A State By State Analysis, 1983.

n/a = not available
sh = semester hours
ch = credit hours

education program planning and development (37, 71, 135, 196). In addition, colleges of education can base their research agendas on the needs expressed by practicing teachers (37).

Conclusion

It is clear from the litany of criticisms and problems outlined in this chapter that teacher education programs face formidable challenges. Reputations for mediocrity, loss of respect within the academic community, and inadequate resources do not make the job easier.

Nevertheless, higher education institutions across the country are addressing the need to educate quality teachers for the future, as well as the need to continue educating those already teaching. The next two chapters present numerous examples of improvements that have been implemented in both preservice and inservice teacher training.

2. Improving Teacher Education: Trends and Major Initiatives

The identification of problems in teacher training and a relative balance in the supply and demand of teachers have created opportunities for change in teacher education programs, allowing them to respond to public demands for better teachers. Schools of education are eager to make their teacher education programs more attractive as they seek to halt continuing enrollment declines (107). A number of professional education associations, including the American Federation of Teachers, the National Education Association, and the American Association of Colleges for Teacher Education (AACTE), are supporting the colleges' efforts to upgrade program quality (26, 38, 53, 107).

A recent survey by the National Center for Education Statistics (NCES) found that 94 percent of teacher education institutions have revised their programs in some fashion in the past five years. AACTE also reported that many member institutions are reevaluating their teacher education curricula (40, 227). The variety of changes indicates a lack of consensus on how to educate teachers most effectively, but the number of changes indicates that many schools are concerned.

This chapter focuses on examples of how higher education institutions are improving their teacher education programs. The examples can be categorized into the following trends:

- Higher admission, retention, and graduation standards,
- Program reviews and restructuring,
- Curriculum changes,
- Training in the use of new educational technologies,
- Extended programs and enhanced field experience,
- Preparation of other professionals to teach, and
- Partnerships involving schools, colleges, and state agencies.

The categories are not mutually exclusive. Rather, this chapter introduces the reader to an array of program changes and suggests possibilities for further reform. Some of these program changes were identified through a 1983 WICHE survey of education deans and chief state school officers in the western states; others were identified through publications, newsletters, and program bulletins. Readers should contact individual programs for more information.

Higher Admission, Retention, and Graduation Standards

In recent years, at least twenty-two states have statutorily increased their requirements for entering, remaining in, or graduating from teacher education programs (197, 208). Table 3 summarizes state-mandated policies for teacher training. Many individual institutions have increased their standards as well. A 1983 survey by NCES found that in the past five years, 74 percent of teacher education programs in the United States have raised their standards for admission (208).

Following are examples of activity:

- Twenty-two states require a minimum grade point average for admission to their teacher education programs. Many institutions have grade point average requirements as well.

- The California State University (CSU) system increased the admission, retention, and graduation standards for teacher education programs on all nineteen CSU campuses. Under the new standards, applicants must be in the upper 50 percent of their class in order to be eligible. They must also demonstrate competency in basic skills, be recommended by the department of their major, and complete a course involving classroom experience. Once admitted, students must meet minimum standards in order to student teach. Program graduates are required to demonstrate competency in both basic skills and subject area.

- East Carolina University in North Carolina raised the requirements for admission to its teacher education program to include a score of at least 644 on the National Teacher Examination (NTE) Core Battery I and II, a 2.2 cumulative grade point average, and passage of a speech and hearing test.

- Louisiana requires teacher education students to maintain a 2.5 grade point average to remain in the program.

- Georgia Southern College has begun rigorously assessing its teacher education students throughout their training. Major assessments are performed when entering the professional sequence, prior to student teaching, and upon graduation.

Table 3

State-Mandated Teacher Training Policies

State	Who Sets Standards for Approval of Teacher Training Programs	Admission Standards[1]			Graduation/Initial Certification Requirements			
		GPA	Standardized[2] Test Scores	IHE Sets All Standards	Required Courses/ Programs	GPA	Competency Test	Student Teaching
AL	SBE	X	X		X	X	X	X
AK	Regional accrediting body			X	X			
AZ	SBE	X	X		X	X	X	X
AR	SEA			X	X	X	X	X
CA	Commission on Teacher Credentialing and IHE			X	X		X	X
CO	SBE	X (set by IHE)	X		X	X	X	X
CT	IHE			X	X		in 1985	X
DE	SBE	X (set by IHE)			X		X	X
FL	Legislature, SBE, SEA and IHE	X (set by IHE)	X		X (for high school)		X	X
GA	Process Evaluation	X	Other Tests		X	X	X	X
HI	SEA	X			X	X		X
ID	SEA			X	X	X		X
IL	SBE			X	X			X (early field experience, also)
IN	SEA		Under Study		X			X
IA	SBE and SEA			X	X			X
KS	SBE	X	Other Tests		X	X		X (early field experience, also)
KY	SBE, SEA, IHE	X	Other Tests		X	X		X
LA	IHE and SEA	X			X	X	X	X (early field experience, also)
ME	SBE			X	X			X
MD	SEA and IHE		Under Study					
MA	SBE			X	X			X
MI	SBE			X	X			X
MN	Board of Teaching			X	X			X
MS	SBE and Board of Higher Learning		X		X	X	X	X
MO	SBE		Other Tests		X	X		X
MT	SBE	X	X		X	X		X
NB	SBE	X			X			X
NV	SBE	X	X		X			X
NH	SBE			X	X			X
NJ	SBE	X	X		X	X		X (early field experience, also)

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Table 3, continued

State	Who Sets Standards for Approval of Teacher Training Programs	Admission Standards[1] GPA	Admission Standards[1] Standardized[2] Test Scores	Admission Standards[1] IHE Sets All Standards	Graduation/Initial Certification Requirements Required Courses/ Programs	Graduation/Initial Certification Requirements GPA	Graduation/Initial Certification Requirements Competency Test	Graduation/Initial Certification Requirements Student Teaching
MM	SBE and IHE		Other Tests	X	X		X	X
NY	SEA			X	X		X	X
NC	SBE		X		Set by IHE		X	X
ND	Board of Higher Education			X	X	X		X
OH	SBE and SEA			X	X			X (early field experience, also)
OK	SBE	X	Other Tests		X	X	X	
OR	Teacher Commission	X (Set by IHE)			X			X
PA	SBE			X	X			X
RI	SEA			X	X			X
SC	SBE		Other Tests		X		X	X
SD	SBE		Under Study		X			X
TN	SBE	X (Set by IHE)	X		X		X	X (early field experience, also)
TX	SBE	X	Other Tests		X		in 1986*	X
UT	SBE	X (Set by IHE)	Other Tests		X			X
VT	SBE	X (Set by IHE)	Other Tests		X			X
VA	SBE	X			X	X	X	X
WA	SBE			X (Also SBE)				X
WV	SBE	X			X		in 1985	X
WI	SEA			X	X			X
WY	Accrediting Body		X		X			X

Source: Adapted from data in Patricia Flakus-Mosqueda, Survey of States' Teacher Policies, 1983.

SBE - State Board of Education (education policymaking body)
SEA - State Education Agency or State Department of Education (administrative education agency)
IHE - Institution of Higher Education
* - Other sources say 1985.

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[1]This does not mean that GPA and standardized test scores are the only admission standards. Institutions of higher education are generally free to implement additional requirements.
[2]Standardized tests include such tests as the California Achievement Test, ACT, SAT, and NTE. The term "other tests" is used when states utilize other, nonstandardized tests.

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- The University of Missouri in Columbia raised the admission requirements for its teacher education program to include a 2.5 cumulative grade point average, screening on personal characteristics, and admission at the program specialization level rather than to teacher education generally.

- The teacher education program at Old Dominion University in Virginia has set new standards for admission, retention, and graduation that exceed university requirements. It has also established specific levels of competence for all courses in the professional education sequence.

- Idaho State University has raised the required grade point average for admission to and graduation from its teacher education program from 2.25 to 2.50. Teacher education majors also must pass a competency test in library skills.

- Oregon State University and Western Oregon State College merged their schools of education in 1982 to eliminate duplication and improve program quality. The joint program "guarantees" its program graduates: it will retrain without charge recent graduates whom school districts determine are deficient.

Program Reviews and Restructuring

- The California State University has studied its teacher education programs extensively and the University of California system is reviewing its programs. These studies may result in a comprehensive revision of teacher education in that state.

- Following a comprehensive review of teacher education in Oregon, the chancellor of the state system of higher education recommended that teacher education programs increase their admission standards, introduce quality checks at various points in the programs, require students to demonstrate classroom ability before graduation, and extend the programs beyond four years. Teacher training institutions are reviewing these recommendations.

- Appalachian State University in North Carolina has established four task forces to review the university's teacher education program. The task forces will develop ways to increase program standards, improve recruitment and retention, develop new programs, and build new curricula and organizational structures.

- Central Missouri State University established a blue ribbon interdisciplinary steering committee of university faculty to examine the school's teacher education program. The committee is to recommend strategies for increasing the emphasis on applied research, involving education faculty in the public schools, and including school teachers in program planning and instruction.

- The University of Missouri at St. Louis held a series of faculty retreats to examine the recent reports on education in relation to its teacher preparation program. The school of education is working with

other university departments, colleagues from other campuses, and the state department of education to review the entire teacher education process.

- Radford University in Virginia restructured its teacher education program in a number of ways. In addition to raising admission standards and instituting rigorous exit criteria, the school of education made major curricular changes and emphasized a field-based program. Partnerships were established with practicing teachers, business, and industry to improve both preservice and inservice teacher education through faculty exchanges, cooperatively developed training programs, and team teaching with school and university faculty.

- The University of South Carolina in Columbia revised its teacher education program so that teacher candidates now major in a subject area rather than in education and earn a baccalaureate degree in the social sciences, humanities, mathematics, or science. The professional education component is then offered in a field-based extended program. The education curriculum incorporates research on effective teaching, and 60 percent of education course work is conducted in the field. The number of required credit hours for prospective teachers was increased from 120 to 138 to allow for more training in mathematics and foreign languages as well as in the subject area to be taught.

- In 1979, the University of Colorado at Boulder eliminated its baccalaureate degree in education although it retained its teacher education function. Teacher candidates now minor in education but pursue their baccalaureate in a subject field. All elementary methods courses were moved into the public schools, so that didactic instruction and field experience could be integrated. All methods courses at the secondary level are problem-based.

- At the University of Texas at Dallas there is no school of education. Rather, teacher education faculty hold appointments in subject matter departments where they teach courses combining pedagogical and subject matter training. By integrating the education and disciplinary curricula in this manner, the university hopes to reduce the isolation of teacher education, the irrelevance of some subject matter courses to teaching, and the overemphasis on professional education courses at the expense of subject matter training.

- Northern Arizona University is establishing a Center for Excellence in Education to replace its college of education. The center will be a cooperative partnership between the university, the state of Arizona, the business sector, and local school districts. Charged with improving the effectiveness of teacher education, the center will perform research on effective schooling. It will involve all academic departments in the university in incorporating that research into the teacher education curriculum and improving the integration of pedagogical and subject matter training. Field training sites will be set up across the state, and classrooms in local community colleges and public schools will be used as laboratories for center students and professors. Master teachers will work jointly with center staff. Students will study during the summer at Northern Arizona University's campus.

- The University of Florida has created a new extended teacher education program called PROTEACH. PROTEACH has reconceptualized teacher training to address three questions: (1) What should a teacher know? (2) What should a teacher be able to do?, and (3) What is the knowledge base for teaching? The program has six components: (1) general education; (2) pre-education (understanding the social milieu in which teaching occurs); (3) foundational education; (4) generic pedagogy; (5) subject-specific pedagogy; and (6) clinical and laboratory experience. While the components are not unique, the content of each has been designed around three primary teaching roles—teacher, person, and professional. Some of the other features that distinguish PROTEACH from traditional teacher education programs are more extensive subject matter training, extensive use of research on effective teaching, more foundational studies, more clinical and laboratory experience, and very high entrance standards.

- Doane College in Nebraska has restructured its teacher education program to address current criticisms. The grade point average required for admission has been increased and all prospective students must be certified as competent in mathematics, composition, and speech. Teaching candidates must also pass a comprehensive examination at the end of their first practicum in the sophomore year. The NTE is used as an exit criterion. The program was also extended to the summer after the senior year. During the first year of teaching, each program graduate is assigned to a member of the teacher education staff who regularly observes the teacher to identify strengths and weaknesses and arrange for inservice training in areas of concern. The new graduate is also assigned to a master teacher in the school who provides three full days of supervision, evaluation, and assistance. Doane pays for a substitute teacher for the supervising days.

Curriculum Changes

A recent survey by AACTE found encouraging signs that member institutions are beginning to use research findings to improve their teacher education curricula (40). Similarly, a 1983 survey by NCES reported that 85 percent of teacher education programs in the United States have changed their curricula in the past five years, although the nature of the changes varied widely and no consensus on curricular improvements emerged (227). Some examples follow.

- The University of Kansas school of education revised its teacher education curriculum to include components on new demands on public schoolteachers, such as state and federal legal requirements and expectations for knowledge about drug and alcohol abuse.

- Coppin State College in Maryland worked with NTE consultants to evaluate the course content and curriculum of its teacher education program in terms of student performance. On the basis of that examination, the college is revising its teacher education curriculum and hiring adjunct faculty from the public schools to teach in the program. Arts and sciences faculty are heavily involved in all teacher education activities.

- After discussing program components, requirements, and expectations with arts and sciences faculty, education students, and the state department of education, Eastern New Mexico University's teacher education program has revised its curriculum to ensure that it reflects contemporary research on effective schools and teaching.

- Arizona State University is planning to switch to a more generic form of teacher education. Instead of dividing the program sequence into elementary, secondary, and special education, the first one-half of teacher training will be divided by topic (classrooms and organization, instructional techniques, etc.). During the second one-half of training, teacher candidates will move into elementary, secondary, and special education programs.

- Michigan State University has established four alternative teacher education programs, each emphasizing a particular aspect of the teacher's role: (1) fostering academic learning; (2) teaching in heterogeneous classrooms; (3) decision making under conditions of multiple and competing expectations; and (4) fostering personal and social responsibility. All four programs provide broad training in subject matter teaching as well as in-depth training in one of the major role requirements.

- Fifteen higher education institutions in Nebraska have formed the Nebraska Consortium for the Improvement of Teacher Education, which assists member institutions to improve their programs by incorporating research on learning and effective teaching into the teacher education curricula.

Training in the Use of New Educational Technologies

Increasingly, both teacher education programs and state policy makers are recognizing the need to train public schoolteachers to use computers. Six states now require certified teachers to be trained to use microcomputers, and an increasing number of programs are adding computer courses to their curricula (24).

- The University of Missouri in Columbia has developed a curriculum on microcomputers for teachers and established a microcomputer laboratory for both preservice and inservice teacher education.

- The state of New York instituted a Regional Network of Technology Learning Centers, a consortium of colleges, universities, and schools that assist one another in evaluating, developing, and purchasing computer hardware and software.

- The University of Georgia developed a technical assistance program to assist individual schools and school districts in using computers for instructional purposes, developing or purchasing computer hardware and software, and training teachers to use new educational technologies.

- As part of a legislative package aimed at stimulating education and training in high-technology fields, the Washington state legislature appropriated $1.6 million in 1983-84 for the superintendent of public instruction to establish regional computer demonstration centers. The centers will provide teacher education services and assist school districts in implementing computer education programs and reviewing software and hardware for instructional use. The legislature also appropriated funds for six workshops on computerized instruction.

- Teacher education students at the University of California, Los Angeles are now required to take nine credit hours in the use of microcomputers.

- California established a network of fifteen teacher education and computer centers to train teachers in computer literacy, software, and hardware. In 1983, the legislature appropriated funds to expand the centers, enhance computer education in the schools, and add computer education to the teacher training curricula.

- The University of Colorado at Boulder purchased thirty-one microcomputers and thirteen printers for its graduate school of education. The microcomputers are used for regular course instruction, laboratory work, and courses in continuing education. All teacher education students receive an orientation to microcomputers and several hours of hands-on instruction. The school of education has also established two centers to encourage computer activity in education: the Center for Research and Development in Instructional Technology, and the Center for Management Information Technology in Education, which provide computer training for school administrators and consulting services to school districts in computer technology.

- George Peabody College for Teachers at Vanderbilt University has a Learning Technology Center which trains teachers to use educational technologies and assists school districts in installing educational technology systems.

- The University of Oregon is establishing a Center for Advanced Technology in Education, which will be a consortium of the university's college of education, other colleges of education in the state, the state department of education, and several public schools. The center will evaluate and develop ways of using computers in the classroom and train both teacher education students and practicing teachers in computer-assisted instruction.

- In 1983, the Florida legislature appropriated $10 million to local school districts to establish laboratories for computer-assisted instruction in mathematics, science, and computer literacy. The laboratories will also be used to train practicing teachers in the use of new educational technologies.

Extended Programs*

Most teacher education programs are four years long. These programs may not be long enough for teacher candidates to learn all they need to know in order to become effective teachers (25, 42, 58, 72, 102, 113, 128, 137, 218, 219). AACTE argues that traditional four-year programs are insufficient in view of teachers' new responsibilities and the increasingly diverse student population (38).

In spite of these arguments, only one state (Connecticut) requires more than four years of training for initial certification. Only 5 percent of all teacher education programs in the United States have extended their program beyond the traditional four years (227). Some educators, including AACTE, recommend that institutions establish extended programs resulting in a master's degree or other graduate-level credits, with the first four years devoted to a baccalaureate degree in an academic discipline (38, 42, 58, 113, 137). Others recommend that fifth and sixth years be used to incorporate more field experience, or that they be spent in carefully supervised internships (58, 71, 72, 128). Some schools of education have extended their programs beyond four years in order to make room for changes in curriculum, field experience, or other areas.

- The school of education at the University of Oregon is working with other university faculty, the public schools, and state education policy boards to implement a post-baccalaureate internship. As a result of recommendations by the Joint Committee on Teacher Education, several public higher education institutions in the state have established pilot projects allowing selected students to participate in five-year teacher training programs.

- In 1981-82, the University of Kansas school of education adopted a five-year teacher training program incorporating substantial field experience. Students receive a baccalaureate degree after the fourth year and graduate credits for the fifth year. No changes have been made in subject matter requirements, but the pedagogy component has been extended.

- Austin College in Texas has established a five-year master's level teacher training program. Field experience begins in a student's freshman year. Fifty hours of classroom teaching are required in the senior year and one full term is devoted to a practicing internship in the fifth year.

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* For additional examples, see "Program Reviews and Restructuring" section.

- Teacher education programs in California are not called extended programs, but most teacher candidates take five years to complete the rigorous curriculum. While the fifth year is not required for initial certification, it is required for permanent certification.

- For several years, the University of New Hampshire has offered a five-year teacher education program. Under this program, teacher candidates receive their baccalaureate degree in a subject area after the fourth year (with a minor in education) and a master's degree in education after the fifth. In making the program five years, the university reduced the number of required methods courses and expanded the field-based component, which now begins in the sophomore year. The fifth year is devoted to a teaching internship and one or two summers of structured course work. Students can choose to complete the internship, but not the other requirements for the master's degree, and be awarded a "Bachelor of Arts plus Internship." The university also instituted stricter selection and retention standards, continued contact with program faculty for beginning teachers, and a number of collaborative efforts with the public schools.

Enhanced Field Experience

A 1983 survey by NCES found that 28 percent of all education deans in the United States believe that the length of student teaching should be increased (227). Some states have strengthened their requirements for student teaching, and at least six states--Illinois, Kansas, Louisiana, New Jersey, Ohio, and Tennessee--require some field experience prior to student teaching (104). In addition, South Carolina requires student teaching in both the junior and senior years. Other examples of activity in this area include:

- Idaho State University increased the field component of its teacher education program to 700 clock hours of classroom experience. Six hundred are spent in student teaching, and 100 in early field experience (combined observation and occasional teaching).

- Several teacher education institutions in Washington offer both campus-based and field-based teacher preparation programs, with additional field experience replacing some education course work in the field-based programs.

- Eastern Montana College increased student teaching from eight to ten weeks for both elementary and secondary teacher education students. In addition, elementary education students complete an eight-credit-hour practicum in their sophomore year. The college is working with public schools to make all methods courses field-based.

- Arizona State University moved from a campus-based to a field-based teacher education program. Field experience (a self-assessment course) is required before admission to the program. Forty percent of the training in the second and third semesters of the program is

conducted in the public schools, where university faculty closely supervise education students. The fourth semester is devoted entirely to student teaching.

- The teacher education program at Holy Names College in California offers continuous field experience during the entire senior year. Student teaching is conducted in four different settings, which vary by socioeconomic status, grade level, school district, and school organization.

- During their student teaching, education students at California State College at San Bernardino receive weekly supervision visits from college faculty. Videotapes are made of student teachers to assist them in identifying their strengths and weaknesses. Team teaching is used extensively.

- Teacher education students at the University of Colorado at Colorado Springs participate in a series of three to four teaching "associateships" per semester. The associateships last four hours a day, five days a week, for three weeks.

- The University of Hawaii at Manoa offers an intensive four-day workshop for student teachers after four or five weeks of student teaching. The purpose of the workshop is to analyze lesson plans, improve instructional techniques, develop observation skills, and enhance human relations skills.

Preparing Other Professionals to Teach

Raising admission and graduation standards risks reducing the supply of qualified teachers. Recognizing this problem, the board of directors of AACTE has recommended that teacher education programs make special efforts to recruit college graduates from noneducation fields, identify their pedagogical needs, and design special programs to train them for teaching careers. Some experts have even suggested that teacher education be bypassed altogether in the recruitment and certification of new teachers (137).

- The University of Colorado at Boulder has an experimental one-year teacher education program called PROBE (Problem-Based Education) for college graduates who want to switch to teaching. PROBE emphasizes practical experience and individualized scheduling. While most teacher education programs begin the prescribed curriculum with education theory and then apply it in the field, PROBE begins with field experience and case studies to identify individual needs for training.

- Harvard University established a Midcareer Mathematics and Science Program in its Graduate School of Education. The program retrains midcareer professionals with backgrounds in mathematics and science.

Students in the program follow a one-year teacher education curriculum, after which they receive a master's degree and certification to teach mathematics or science at the junior or high school level.

- To assist the Los Angeles school district, which employs a large number of teachers on emergency certificates, California State University at Northridge established an Experimental Single Subject Project. Under this program, teaching candidates teach full time on emergency certificates while taking the education course work necessary for full certification.

School-College-State Partnerships

Experts increasingly recognize the importance of collaborative efforts in addressing many aspects of public schooling (18, 121, 146, 148). It is argued that colleges and universities need to recognize their contribution to teaching in the context of partnerships with local schools, state education agencies, and the organized profession (112). Some of the recommended focuses for school/college partnerships include exchanging information and faculty, whereby teachers and school district officials go to university research and development specialists for assistance in solving educational problems (121); developing methods for rewarding and recognizing teaching excellence; developing joint research agendas as well as dissemination and implementation strategies; collaborating on curriculum development; instituting special programs for school administrators, teachers, and students; and affiliating university faculty with the schools (5, 146). As Maeroff suggests, "Partnerships work because the agenda is not dictated by colleges, but developed collaboratively with the schools" (148, p. 68).

Some examples from recent years include:

- Eight school systems and seven higher education institutions in Alabama have formed the Jefferson County Educational Consortium. The purposes of the consortium are to improve the high school curriculum, enhance students' reading and writing scores, increase communication between the colleges and public schools, and define and encourage better teaching.

- The University of California, Los Angeles runs an Office of Academic Interinstitutional Programs that puts faculty members from specialty fields in contact with outstanding schoolteachers to develop new curricula for elementary and secondary teachers.

- The University of Georgia has instituted a technical assistance program in which ad hoc committees of experts assist local schools and school districts in working out solutions to specific educational

problems. The university also has set up two interdisciplinary task forces to study ways of improving science, mathematics, reading and language instruction.

- The Florida Mellon Project uses community college and university experts to help four public high schools modify their curricula to meet new state standards and increase the college participation rate of black high school students. Other efforts include inservice training, disseminating college admission standards, and providing feedback for changes in university admissions policies.

- Washington State University has created an Office of Field and Applied Studies and Training, which has an interdisciplinary advisory board made up of university faculty and administrators. Using the expertise of a broad range of university faculty, the office assists public schools in improving their educational programs and services.

- Oregon State University's Department of Mathematics operates a program entitled "Topics in Mathematics Education." A prime example of a fruitful cooperative effort between arts and sciences faculty, teacher education faculty, and public schoolteachers, this program examines a variety of issues in mathematics education through contributions from preservice, inservice, and postsecondary mathematics teachers.

- The University of California, Irvine established the Student-Teacher Education Project (STEP) with the Santa Ana Unified School District. The goal of the collaborative project is to raise college matriculation rates by increasing the expectations of students and teachers, helping students plan their high school programs, providing incentives such as public recognition of students' academic achievements, and enhancing student support systems.

- George Peabody College for Teachers at Vanderbilt University has an Institute for School Improvement to provide technical assistance to local public schools and school districts.

- Tennessee passed legislation requiring that teacher educators spend time teaching in the public schools in order to enhance their awareness of the needs and problems facing contemporary schoolteachers.

- The Massachusetts Institute of Technology has helped the public schools introduce pupils to new educational technologies, and has worked with Harvard University and Lesley College to start an elementary school that integrates computer training into the curriculum.

- The Colorado Department of Education conducts an annual survey of first and third year teachers who graduate from Colorado schools. The survey asks the teachers to evaluate various components of their professional training in relation to their actual experience in the public schools. The survey results are shared with teacher training institutions to help them make program improvements.

- Utah has a Statewide Articulation and Planning for Education (SAPE) Committee which has been working for several years to establish cooperative relationships between the state department of education and teacher education programs.

- As a result of a five-year cooperative effort between the schools of education, state department of education, and teachers in Montana, new standards were implemented in 1979 that address the total teacher education process. Through a continuing cooperative effort, the standards now are being reviewed and updated.

- In Hawaii, the department of education is legislatively mandated to meet with state teacher education institutions at least six times a year to identify, study, take action, or make recommendations on common concerns.

Conclusion

It is clear that teacher training institutions are taking decisive steps to improve preservice teacher education. The wide diversity of reforms underscores the creativity--but also the lack of agreement--among educators on how to make teacher education most effective. Recent changes are encouraging.

Teacher educators need to continue to define what a beginning teacher should know and be able to do. University leaders must also recognize the critical importance of teacher education programs to the future of education at all levels, and give these programs adequate resources--time, money and personnel--to carry out needed improvements. As this chapter has shown, the willingness of teacher training institutions to recognize weaknesses and introduce major improvements suggests that the opportunity exists to build a strong profession dedicated to achieving greater excellence in education.

3. Improving Teaching: A Matter of Standards

Initiatives for improving the preservice education of teachers are necessary, but in the short run they affect only a small proportion of the teaching work force. The majority of teachers already are in the classroom; many others are about to graduate from teacher training and will not benefit from preservice initiatives. Two principal ways that states and school districts can improve these teachers are competency testing and inservice education. Higher education is responsible for preparing graduates to meet competency requirements; it also provides inservice education after they begin teaching.

Competency Testing

There is a growing trend in the states to increase the requirements for teacher certification, which is the primary regulatory means for ensuring minimum competence (165, 172, 187, 205). Over thirty states have revised their licensing and certification requirements in recent years (205) and many states have begun using competency tests for initial certification in reaction to concerns about the quality of new teacher graduates (188, 191, 219). Competency testing serves a gatekeeping function by screening out candidates who lack the minimum knowledge and skills to teach effectively. Candidates who fail competency tests can be denied certification until they remedy their deficiencies. As many as 20 to 40 percent of applicants fail teacher competency tests on their first attempt (64, 126, 187).

Competency tests generally measure minimum proficiency in basic skills, subject matter, and pedagogy. In some states they are administered prior to admission to teacher education programs; in others they are part of the job application process. Most often, students take competency tests prior to graduation in order to be recommended for certification by the professional school. No states require competency testing of practicing teachers, although

Arkansas and California require testing for teachers who wish to be recertified in new subject areas. Arkansas plans to begin testing practicing teachers during the next few years.

Only three states required competency testing for teacher certification prior to 1980. Since that time, the number of states using competency tests has increased to twenty-one and at least nine more states are considering it (12). Several other states, such as Kansas and Missouri, administer basic skills tests as a prerequisite for entering teacher education, but the tests are not an official part of the certification process. More states are likely to start testing because of overwhelming public support (27, 163, 187, 206). Table 4 identifies the states that require competency testing for teachers. It also indicates the type of test used, the areas that are tested, who is tested, and whether authorization for testing is legislative or regulatory.

There are two basic types of tests: the National Teacher Examination, which is a standardized, norm-referenced battery of tests developed by the Educational Testing Service; and state-developed, criterion-referenced tests. Most states that use competency tests employ state-developed tests that measure subject area and/or professional knowledge.

Competency tests appear to be an effective way of eliminating candidates who are clearly not ready to teach. Since passing scores generally are set quite low, the 20 percent or more who do not pass the tests probably do not possess the minimum ability to teach (187, 198, 219).

The use of competency tests to improve teacher quality, however, does pose problems. First, competency tests may reduce the number of prospective teachers unless incentives are provided to attract and retain more qualified candidates (126, 172, 188, 205). Poorly qualified teaching candidates may be eliminated but highly qualified people will not necessarily be attracted into teaching (219).

Second, the validity of competency tests as predictors of effective teaching has not been firmly established, and the relationship between academic ability and teaching success is not proven (126, 187, 204). The tests purport to measure only minimum competence, not to distinguish levels of teaching ability. There is no universal agreement, however, as to which areas of competence are necessary for effective teaching.

Table 4

Teacher Competency Testing for Certification
(as of January 1984)

State	Authority	Year Effective	Type of Test	Who Is Tested	Areas Tested
Alabama	SBE	1981	State	TC	SA/PK
Arizona	Legis	1980	State	TC	BS(1)
Arkansas	Legis	1983	NTE	TC	SA/PK
California	Legis	1982	State	TC	BS
Colorado	Legis	1983	State	EM/TC	BS
Connecticut	SBE	1985	State	TC	SA/PK
Delaware	SBE	1983	NTE	?	BS
Florida	Legis	1980	State	TC	BS
Georgia	SBE	1979	State	TC	SA
Louisiana	Legis	1979	NTE(2)	EM/TC	SA/PK
Mississippi	SBE	1977	NTE	EM/TC	SA/PK
New Mexico	SBE	1983	State	EM/TC	BS/SA/PK
New York	SBE	1984	State	TC	BS/SA/PK
North Carolina	SBE	1981	State	EM/TC	SA/LA
Oklahoma	Legis	1982	State	EM/TC	SA
Oregon	TSPC	1985	Uncertain	TC	BS
South Carolina	Legis	1982	NTE/State	EM/TC	SA/BS
Tennessee	SBE	1981	NTE	EM/TC	PK
Texas	SBE/Legis	1985	State	EM/TC	SA/BS
Virginia	Legis	1981(3)	NTE	TC	SA/PK
West Virginia	SBE	1985	State	TC	SA/BS

? = Data not available
TC = Teaching Certificate Applicants
EM = Education Major
BS = Basic Skills
LA = Liberal Arts
SA = Subject Area
PK = Professional Knowledge
NTE = National Teacher Examination
SBE = State Board of Education
Legis = State Legislature
TSPC = Teacher Standards and Practices Commission

[1]The SBE has also added a requirement for professional competency testing.
[2]Temporary one year certificates are issued to candidates who come within 10 percent of the cut-off score.
[3]Passage not mandatory until 1986.

Source: Russell B. Vlaanderen, "Teacher Competency Testing: Status Report," Educational Measurement: Issues and Practice, Summer 1982; and National Center for Education Statistics, The Condition of Education, 1983 Edition. Updated using additional sources.

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Third, minority group candidates systematically perform worse on competency tests than white candidates (126, 187, 204, 205). While the U.S. Supreme Court has said that thoroughly validated competency tests are legal even if they have an adverse impact on minorities, states must consider the effect such tests will have on the racial composition of their teaching work force (165).

Fourth, qualifying scores are so low that the quality of new teacher candidates may not increase significantly. Conversely, raising competence standards too high will tend to exacerbate the anticipated teacher shortage (187, 198, 205).

Fifth, competency tests have little effect on the quality of existing teachers, who will make up the majority of the teaching force through the 1980s (58, 163, 209).

Finally, competency testing does not address candidates' actual performance in the classroom. To address this issue, some states are introducing a two-step certification process. The first step is provisional certification for beginning teachers (i.e., teachers serving in an internship or apprenticeship), who are closely observed and evaluated. The second step is permanent or standard certification, which is contingent upon satisfactory performance during the provisional period (137, 172, 187, 198, 205, 208, 209). Performance evaluations during the provisional period can be tied to inservice training to help eliminate weaknesses (163, 205, 218, 219). These systems of diagnostic evaluation, feedback, and remedial or developmental training make it possible to either help or disqualify persons who do not perform satisfactorily in the classroom before they receive full certification (191).

At least eleven states--California, Florida, Georgia, Louisiana, Maryland, New York, Oklahoma, Rhode Island, South Carolina, Vermont, and Virginia--have added classroom observation to the certification process, and Arizona has implemented pilot internship programs in several school districts. Georgia and South Carolina also conduct performance assessments of student teachers to assure that candidates possess certain performance competencies before they are even provisionally certified.

Inservice Education

Effective inservice education is critical to maintaining a high quality teaching force. While competency testing addresses minimum knowledge and skills, inservice or continuing education enables teachers to enhance their competencies. Through inservice training, teachers can update their subject matter knowledge, learn new teaching techniques, incorporate new research and other information about effective teaching, solve problems encountered through experience, engage in skills training, and undertake traditional postgraduate work. Importantly, inservice programs are a way to affect the majority of teachers on a continuing basis and help relieve feelings of isolation by providing support and bringing them together to discuss common concerns and experiences (16, 25, 63, 95, 107, 135).

In spite of the attention given inservice training, many experts criticize typical inservice training as being ineffective, inadequate in both substance and amount, and irrelevant (36, 58, 63, 148, 221). Too often, such training is limited to one-day workshops or university courses for advanced certification. Unlike professions that prescribe or endorse professional development activities (e.g., nursing or engineering), continuing education for teachers is often the haphazard accumulation of graduate credits unrelated to specific objectives. Maeroff states that continuing education programs have "done little more than generate income for institutions of higher education while providing teachers with empty academic credits that some sought merely to boost themselves up the salary steps to higher pay" (148, p. 33).

School districts need to collaborate with schools of education to design inservice training plans that are both relevant to the local instructional program and tailored to meet the needs of individual teachers (139, 163, 218).* Teacher education programs and higher education generally can make an important contribution to teaching through inservice education, especially if preservice education lacks the time or resources to prepare teachers adequately (25).

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* Georgia and Oklahoma already have taken steps to promote cooperation. For example, Oklahoma mandates continuing education programs for all teachers, with the programs administered by staff development committees in each school district.

Continuing education can also be tied to advanced certification programs, which many experts claim need to be strengthened (135). While all states require the baccalaureate degree for initial or provisional certification (only Connecticut requires more than a bachelor's degree), twenty-eight states now require additional college credits for regular or standard certification (100, 137). Moreover, most states require or encourage teachers to participate in professional development activities on a regular basis (104). Forty-four states have state-level staff development programs, most of which are implemented at the district level (104).

Collaborative Approaches to Inservice Training

Schools need new approaches to inservice teacher training. Whether this can be accomplished within the existing educational structure, which isolates schools from colleges of education and higher education generally, is questionable (37, 63, 107, 112, 135, 148). Higher education and the schools need to view inservice education as their joint responsibility (37, 63, 107, 112, 135). Many teacher education institutions and school districts are beginning to reevaluate their inservice programs along these lines. Many collaborative programs are being proposed or implemented in the form of teacher centers, faculty/teacher exchanges, summer institutes and workshops, consultation services, and educational consortia (26, 107, 121, 148, 221).

Examples of innovative inservice programs follow.

- The Yale-New Haven Teacher Institute was established in 1978 to strengthen secondary teaching in the humanities and sciences. Participating teachers from the New Haven schools attend five-month interdisciplinary seminars conducted by Yale faculty, during which they prepare new curricula to use in the schools. As part of the program, teachers receive $650 stipends and become members of the Yale community for one year (e.g., they have full access to libraries, computer facilities, etc). Forty percent of New Haven's secondary teachers in the sciences and humanities have participated in the program since its inception.

- The Pennsylvania State System of Higher Education established a "Partnership in Basic and Higher Education" program. Through the program, state universities assist local elementary and secondary schools in such areas as computer training, joint teacher/faculty projects, special summer sessions for mathematics and science teachers, and other special projects to be developed by each partnership.

- The National Humanities Faculty (NHF) is a network of over 700 college and university faculty who work with teachers in the public schools to strengthen their humanities teaching. Schools submit proposals to NHF

for specific humanities projects in such areas as course and curriculum development, expanding teachers' subject matter knowledge, and developing teaching skills. Teams of NHF professors are sent to the schools to serve as consultants on the projects, but the schools themselves design and administer the projects.

- In 1982, the National Endowment for the Humanities instituted a nationwide program of seminars for high school teachers. The program provides four to six weeks of advanced study in the humanities under the direction of a master teacher and distinguished scholar in the field. Participants improve their teaching skills and subject matter knowledge by reading primary texts in the humanities, discussing the works, and writing extensively.

- The Program on Teaching Effectiveness at the Stanford Center for Research and Development in Teaching has established an experimental inservice teacher education program. On the basis of statistical correlations between teacher behavior and pupil outcomes, an experimental group of teachers was instructed to engage in specific teaching behaviors for set amounts of time. The relative effectiveness (in terms of pupil outcomes) of the experimental and control groups is now being evaluated.

- In 1981, the California legislature passed a law establishing teacher development centers that provide basic skills training for teachers. In 1983, further legislation required teachers on standard certificates to take 150 clock hours of continuing education courses every five years as a condition for recertification.

- The Illinois State Physics Project and College/High School Teachers Interaction Project form an informal metropolitan network of science teachers in four Illinois high schools and six colleges. Members meet monthly to share ideas, improve their teaching skills, and develop experiments and demonstration projects.

- Twenty-eight New York City high schools have joined with Lehman College of the City University of New York to establish the Writing Teachers' Consortium for faculty development in the area of writing. Faculty and teachers collaborate in on-site training, retreats, and summer seminars, and develop course syllabi and materials to meet the needs of individual schools.

- The Brown University Teaching Project in Rhode Island works with teachers in the Providence schools to encourage teacher/faculty collaboration, develop new instructional strategies, and broaden subject matter awareness. The project has conducted ongoing institutes and seminars on foreign language instruction, writing instruction, and American history.

- The State University of New York at Buffalo has established an in-service training program in the humanities with the Buffalo City School District. Thirty American literature and history teachers in

grades seven to twelve will participate in a summer institute, seminars, and classroom activities with university faculty, after which they will work with other teachers as part of an ongoing collaborative effort.

- The Charleston Higher Education Consortium in South Carolina established a Scholars-in-Residence program, which places college humanities faculty in full-time, semester-long residencies at five local high schools. The purpose is to promote a deeper understanding of the humanities among high school teachers and students.

- The University of Arizona instituted an Adopt-a-School Program, which allows faculty members to work half-time on staff development projects for local high schools with high minority enrollments.

Conclusion

Competency testing and innovative inservice education are two methods being used in many states to raise the quality of teachers. Recently, testing for teacher competence has been legislated by a majority of states in an effort to prove mastery of basic academic skills. However, there are problems with the validity, selectivity, and discriminatory effects of the tests. Further, competency tests may exacerbate the problem of a teacher shortage; unqualified teacher candidates may be weeded out, but the tests will do nothing to attract qualified persons to the profession.

Inservice education typically has not contributed to teacher effectiveness, being criticized as ineffective, inadequate, and irrelevant. There are new programs, though, that provide innovative training plans for teachers. These are encouraging efforts in which higher education and schools both benefit, and teacher quality is improved.

4. The Reach for Quality: Supply, Demand, and Other Complications

As previous chapters have shown, higher education institutions can make major contributions to the quality of education through training new teachers, providing inservice and continuing education for teachers already in the classroom, and assisting in elevating the standards required for teaching. While these contributions are critically important, however, they are not comprehensive solutions. A multitude of factors must be acknowledged and dealt with if efforts to improve education are to be both successful and lasting. There is no single solution to raising education quality.

One major factor, often overlooked, is the impact that teacher supply and demand have on teacher education and instruction. In past years, serious shortages of teachers necessitated an overriding concern with quantitative rather than qualitative issues (216). The current emphasis on quality comes after several years of oversupply. Long-term success in improving education quality will depend to a substantial degree on the balance or imbalance of teacher supply and demand. This chapter goes into some detail on the supply/demand issue, and looks briefly at reasons for the currently diminishing supply of teachers. It concludes with suggestions for attracting and retaining more high-quality people in the teaching profession.

The History of Supply and Demand

Teacher supply and demand have fluctuated considerably in the past thirty years. The 1950s and early 1960s experienced a critical shortage of teachers as the baby boom generation flooded the public schools (46, 204). In response to the teacher shortage of the 1950s, enrollments in teacher education programs expanded dramatically in the 1960s, and the total number of employed teachers increased 48 percent between 1950 and 1970 (46, 172, 225). In addition to being new and inexperienced, many of the "boom" teachers were underqualified. In 1950, for example, nearly one out of every seven teachers

had substandard credentials (137, 172, 225). Since many of these underqualified teachers were eventually tenured, their employment contributed to a long-term decline in the quality of the teaching work force (64, 137, 205, 225).

The job market for teachers stabilized by the mid-1960s, although there were still shortages in certain locations and subject areas (178, 204). By 1969, however, enrollments in elementary and secondary schools had started to decline, and the production of teacher graduates was almost triple that of 1960 (46).

As a result, the 1970s were characterized by an overabundance of qualified teachers (46, 52, 74, 204). While the production of teacher graduates began to decline after 1973, it remained at a high level through most of the 1970s. Meanwhile, demand for new teachers continued to fall as enrollments in elementary and secondary schools declined (152, 178). Table 5 illustrates how supply exceeded demand throughout the 1970s, although the ratio of supply to demand gradually decreased to the point of equilibrium by the start of the 1980s.*

In response to the poor labor market of the 1970s, enrollment in teacher education programs dropped over 50 percent between 1972 and 1980 (172, 178). The production of elementary teachers declined 41 percent during that period, and the production of secondary teachers declined 51 percent (34). In 1972-73, 38 percent of all undergraduates were enrolled in teacher education programs, compared with 21 percent in 1978-79 (137). While the total number of baccalaureate degrees conferred increased 11.4 percent between 1970-71 and 1980-81, the number of degrees awarded in education declined 38.7 percent (Table 6).

National aggregate figures of supply and demand are insufficient descriptors of the problem, however, because regional and subregional markets differ considerably (45, 74, 86, 204, 205). Regions experiencing economic growth, such as the Sunbelt and Rocky Mountain states, have greater demand

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* Not all teacher graduates actually seek teaching positions--in 1978, for example, 23 percent did not apply for teaching jobs, and in 1981, 15 percent did not apply (100, 137, 155, 156, 178). In addition, a large pool of people qualified to teach remain out of the job market at any given time.

Table 5

Estimated Supply and Demand for Additional Teachers, 1971 to 1992

Fall of Year	Supply of New Teacher Graduates	Demand for Additional Teachers	Ratio of Supply to Demand
1971	314,000	163,000	1.93
1972	317,000	179,000	1.77
1973	313,000	175,000	1.79
1974	279,000	183,000	1.52
1975	238,000	186,000	1.28
1976	222,000	150,000	1.48
1977	194,000	181,000	1.07
1978	181,000	138,000	1.31
1979	163,000	129,000	1.26
1980	144,000	127,000	1.13
1981	141,000	110,000	1.28
1982	143,000	143,000	1.00
1983	146,000	148,000	.99
1984	146,000	142,000	1.03
1985	146,000	157,000	.93
1986	144,000	170,000	.85
1987	142,000	160,000	.89
1988	139,000	164,000	.85
1989	139,000	173,000	.80
1990	139,000	183,000	.76
1991	138,000	195,000	.71
1992	137,000	209,000	.66

Note: Supply/demand estimates are projections from 1983-92.

Source: National Center for Education Statistics, The Condition of Education, 1984 Edition.

Table 6

Baccalaureate Degrees in Education Compared to Total Baccalaureate Degrees

Degrees Awarded	1970-71	1980-81	% Change
Total Baccalaureate Degrees	839,730	935,140	+11.4%
Baccalaureate Degrees in Education	176,614	108,309	-38.7
Education as a Percent of Total	21.0	11.6	-9.4

Source: C. Emily Feistritzer, The Condition of Teaching: A State by State Analysis, 1983.

relative to supply than regions hard hit by recession or regions with an aging and sometimes declining population (45). Additionally, while the decline in youth aged 5-17 averaged 25 percent for the nation in the 1970s, no decline occurred in most of the Sunbelt states. There are differences in the relationship of supply and demand within states as well. While there tends to be an abundance of teachers willing to work in suburban school districts, nearly all inner city and rural school districts have difficulty finding teachers (45, 92, 205).

Teaching specialty areas also differ in the relationship of supply to demand. In the early 1980s when the overall supply and demand for teachers had shifted toward approximate balance, most states were reporting shortages in some subject areas (e.g., mathematics, science, agriculture, special education, and industrial arts), while surpluses remained in others (e.g., the social sciences, physical and health education, art, and home economics) (47, 160). A 1982 national survey of teacher placement officers found that most states had a slight or considerable surplus of teachers in twelve different subject areas, with considerable surpluses in fields such as health, social sciences, and physical education (35, 55). In contrast, eleven subject areas showed a balance of supply and demand, and fifteen showed a slight to considerable shortage of teachers. Regions of the country differ to some extent in the subject areas that suffer a shortage of teachers (44). Shortages of mathematics, science, and special education teachers are common, and shortages in data processing, industrial arts, and vocational education also are widespread (35, 44, 55, 105, 106, 173, 174).

The subject area imbalance in supply and demand is particularly noticeable in the fields of mathematics and science. Overall, the number of qualified mathematics and science teachers is dropping three times faster than K-12 enrollments, just as increased emphasis is being placed on mathematics and science education (194). A 1981 survey found that forty-three of forty-five responding states had a shortage of mathematics teachers, and forty-two had a shortage of physics teachers (224). Between 1971 and 1980, there was a 64 percent decline in the production of new secondary science teachers and a 78 percent decline in the number of new mathematics teachers (206). In addition, less than 50 percent of those trained as mathematics and science teachers actually go into teaching, apparently because teacher salaries are far from competitive with those in industry (173, 190, 224). Exacerbating the

problem is the fact that five times as many mathematics and science teachers leave classrooms to take nonteaching jobs as do teachers in other subject areas (105). Twenty-five percent of current mathematics and science teachers expect to leave teaching in the near future (224). Because of the serious shortages, vacancies for mathematics and science teachers are often filled with people unqualified to teach in those areas. In 1981, 50 percent of all newly employed mathematics and science teachers were not fully certified to teach in their assigned fields, compared with 22 percent of newly employed teachers in other fields (178, 206).

Projections of Supply and Demand

Overall, a moderate to severe shortage of teachers is projected through the rest of the 1980s and the early 1990s (see Table 5). Observers project that the supply of new teacher graduates will meet only 85 percent of the national demand in the next few years (11, 45). This is largely because the baby boom generation, which flooded the schools in the 1950s, has begun to have children of its own, causing the birth rate to increase since 1979 (74, 160). Public school enrollments have bottomed out and will increase as the baby boom "echo generation" enters the school system. The demand for secondary teachers will continue to decline until 1990, when the echo generation will enter secondary school, but the demand for elementary teachers should continue to increase at least through the early 1990s (44, 130, 152, 160, 173, 178, 203, 205).

By 1992, the number of teaching positions in the public schools is projected to rise to an all-time high of 2,229,000, with another 325,000 teaching positions expected in private schools (173, 178). Because of improved pupil-teacher ratios, expanded services in special education, and a new emphasis on mathematics, science, technology, and vocational training, the demand for teachers is likely to grow even beyond that generated by increased enrollments alone (173). Moreover, the teaching population is aging and many teachers will reach retirement age by the early 1990s (64, 78, 139). For these reasons, the annual demand for teachers is expected to increase at least through 1992.

At the same time, several unknown factors may change projected demand figures. The most important are unexpected changes in the pupil-teacher ratio and the annual turnover rate (110, 178). The annual turnover rate--an

important determinant of the demand for additional teachers--has been stable at approximately 6 percent nationwide (108). The rate at any given time, however, varies from state to state and depends to some extent on economic conditions that influence the ease of moving out of teaching into more lucrative fields (108, 178).

Experts most often disagree on long-range projections of the supply side of the manpower equation. Teacher supply figures are more uncertain than demand projections; they depend on people's choice of careers. If the percentage of baccalaureate degrees awarded in education (12 percent in 1981) does not increase, the supply of new teachers will not meet the growing demand. Either more young people must choose teaching as a career or the reserve pool must return to teaching in unprecedented numbers (173). However, the relatively large reserve pool of past years--the product of past over-supply--will not exist in 10-15 years, when the immediately preceding years will have been years of undersupply.

In addition, the number of students entering college is expected to decline as the number of 18-24 year olds decreases (71, 205). Table 7 shows a projected drop of almost 6 percent in undergraduate enrollments between 1983 and 1992. This means that a greater percentage of students will have to major in education in order for the absolute number of teaching graduates to keep up with demand.

Table 7

Projected Undergraduate Enrollment, 1983 to 1992

Year	Total Undergraduate Enrollment in Thousands	Percent Change From 1983
1983	10,731	--
1984	10,649	-0.77
1985	10,557	-1.62
1986	10,447	-2.65
1987	10,413	-2.96
1988	10,417	-2.93
1989	10,434	-2.77
1990	10,376	-3.31
1991	10,263	-4.36
1992	10,098	-5.90

Source: National Center for Education Statistics, The Condition of Education, 1984 Edition.

In any case, there is a time lag between changes in demand and changes in students' choice of a college major. The drop in current teacher education enrollments, for example, is partly a response to the reduced demand of the 1970s (152, 205). Even though the media are beginning to cite some imminent teacher shortages, fewer college students are going into teaching, and it may take some time before the increase in demand is reflected in higher enrollments (45).

Taking these factors into account, if the marketplace fails to increase incentives for teaching (and if students do not enroll in teacher education programs in greater numbers), there will be a moderate to severe shortage of teachers in most subject areas by 1990 (64, 78, 105, 173, 203, 204, 205). Some analysts foresee particularly severe shortages in inner cities and rural areas, and in mathematics and science everywhere (105, 174, 203).

In summary, the production of new teachers has steadily declined since the early 1970s, and this trend is not expected to reverse for a few years. Just when public school enrollments are beginning to increase, fewer people are going into teaching. The result may be an inadequate supply of elementary and secondary level teachers to meet demand by the end of the decade, with critical shortages in some localities and in some subject areas.

Reasons for the Decreasing Supply

There are a number of reasons for the decreasing supply of teachers which must be addressed if the impending shortage is to be alleviated:

- Diminishing student interest in teaching,
- Poor public image of the teaching profession,
- Low salaries for teachers compared to other occupations,
- Poor working conditions,
- Absence of opportunities for career advancement,
- Expanded career opportunities for women in other professions, and
- Adverse effects of regulations (such as competency testing) to improve teacher quality.

Diminishing Student Interest. Recent surveys indicate that college freshmen are less interested in becoming teachers than in previous years, and far fewer high school seniors say they intend to choose education as a major in college (69, 178). Table 8 shows a startling decline in the percentage of freshmen indicating elementary or secondary teaching as their probable occupation--from 19.3 percent to 4.7 percent between 1970 and 1982.

Poor Public Image. Clearly, teaching has become relatively unattractive as a career choice (160, 172). Increasing union militancy, discipline problems and violence in the schools, and student apathy have contributed to a poor public image of teaching (25, 55, 205). The poor labor market for teachers in the 1970s, as well as layoffs in some districts in recent years, has further diminished the appeal of teaching.

Low Salaries. The material benefits of teaching have substantially eroded during the 1970s and early 1980s. As Table 9 shows, teachers' salaries are not competitive with business or industry (especially in mathematics and science), and are losing ground relative to other occupations (11, 25, 55, 78, 160).

Low salaries and a poor public image contribute to a high attrition rate in the teaching profession (64, 71, 137, 204, 205). One-half of all teachers leave the profession by their seventh year, in part because the relative financial rewards of teaching decrease as the years of experience increase (137).

Poor Working Conditions and Absence of Opportunities. Poor working conditions also contribute to the declining supply of teachers (25, 55, 58, 78, 160, 211). Sykes points out that the traditional intrinsic rewards of teaching decline as the conditions of teaching deteriorate (205). Teaching is a high-stress occupation, and teachers generally exhibit less job satisfaction than other professional groups (71). In many cases teaching is characterized by boredom and stagnation, absence of professional development opportunities, little or no recognition for outstanding performance, and few opportunities for upward mobility. Perhaps most importantly, Boyer argues, teachers have few opportunities to discuss concerns and solve common problems. As a result, teachers often feel powerless and isolated (58).

Table 8

Percent of Freshmen Indicating Elementary or Secondary Teaching as their Probable Career, 1970 to 1982

Fall of Year	Percent
1970	19.3
1971	15.4
1972	12.1
1973	8.8
1974	7.7
1975	6.5
1976	8.0
1977	6.9
1978	6.2
1979	6.4
1980	6.0
1981	5.5
1982	4.7

Source: National Center for Education Statistics, The Condition of Education, 1983 Edition.

Table 9

Average Starting Salaries of Public School Teachers Compared to Starting Salaries in Selected Other Fields

	1973-74	1981-82	Percent Change
Mean for Teachers with a Bachelor's Degree	$ 7,720	$12,769	65.4%
Mean for Other College Graduates with a Bachelor's Degree			
Engineering	11,220	22,368	99.3
Accounting	10,632	16,980	59.7
Sales-Marketing	9,660	17,200	78.3
Business Administration	8,796	16,200	84.2
Liberal Arts	8,808	15,444	75.3
Chemistry	10,308	19,536	89.5
Mathematics-Statistics	10,020	18,600	85.6
Economics-Finance	9,624	16,884	75.4
Computer Science	N/A	20,364	N/A

Source: Emily Feistritzer, The Condition of Teaching: A State by State Analysis, 1983.

Career Opportunities for Women. The expansion of career opportunities for women has diminished the traditional female base of the teaching profession (25, 64, 78, 137, 172, 173, 203, 204, 205). As the social, familial, and occupational roles available to women have increased, teaching has lost its unique appeal. Women can now earn more money and often experience greater satisfaction in nonteaching jobs (172, 183, 205). In 1970-71, 36.1 percent of the baccalaureate degrees awarded to women were in education; the proportion had dropped to 20.8 percent in 1978-79. The comparable percentages for men dropped only 2.4 points during the same period, from 9.5 percent to 7.1 percent (183). The percentage of female college freshmen who intended to go into elementary or secondary level teaching declined dramatically from 37.5 percent in 1968 to 7.4 percent in 1982, while the percentage who intended to go into many other professional fields increased substantially (e.g., business from 3.3 percent in 1968 to 33 percent in 1982, law from 0.6 percent to 3.9 percent, and engineering from 0.2 percent to 3.6 percent) (217).

Adverse Effects of Regulation. Efforts to raise teacher quality may also have a negative effect on supply (55, 65, 141, 172, 173, 198, 204, 216). Policies to increase quality have generally been regulatory in nature (e.g., competency testing, increased certification requirements, and increased admission standards for teacher preparation programs) and may prevent some potential candidates from enrolling in teacher education programs or applying for teaching jobs (55, 141, 173, 198). Thus, efforts to raise standards for teacher education and certification may aggravate a teacher shortage (65, 172, 198, 204).

Vance and Schlechty have shown that a massive teacher shortage could result if strict selection procedures are used to eliminate the least qualified students from teacher education, especially since it is those students who are also the most likely to enter and remain in the teaching profession (216).

Combatting Teacher Shortages

If the supply of new teachers and retention of present teachers are to increase at the same time that higher standards are required, incentives must be found to make teaching a more attractive career (113, 172, 173). Emergency or temporary certificates--the common approach to alleviating spot shortages

in the past—are not appropriate for widespread shortages. Heavy reliance on emergency certificates would also undercut attempts to upgrade teacher quality (105).

The most common suggestion for improving the attractiveness of teaching is to increase salaries (58, 71, 78, 160, 172, 173, 206). Although the intrinsic rewards of teaching have been assumed to outweigh the material rewards, it is increasingly difficult to attract qualified people who can reap greater benefits in business and industry. One study found that teachers are at least as responsive to wage differentials as other workers, and this conclusion is supported by teachers' collective bargaining behavior in recent years (51).

In addition, there is virtually no career mobility in teaching nor is there sufficient recognition of outstanding performance. One of the few ways teachers can advance professionally and financially is to move out of teaching and into administration (137, 171). Consequently, many experts have proposed merit pay and master teacher plans (78, 113, 171, 172). Merit pay ties teachers' salaries to effective evaluation systems that reward high quality teaching. Master teacher plans restructure the profession into a hierarchy of roles--a career ladder--tied to a differentiated pay scale. Proponents claim that restructuring teachers' career opportunities in this way will greatly improve the attractiveness and public image of teaching and provide teachers with incentives to stay in teaching for a longer time (113, 171, 172).

Some experts contend that the key to strengthening the teaching profession is to restructure the schools as a work place (25, 58, 113, 116, 117, 135, 137). They recommend changing the inflexible school environment to allow more professional discretion to teachers, particularly in implementing innovative teaching methods (2, 58, 116, 117, 135). Several strategies could accomplish this objective: (1) reducing the teaching load in order to provide more time for class preparation and interaction with other teachers; (2) exempting teachers from noninstructional duties; (3) encouraging creativity through mechanisms such as grants and release time for special projects; (4) improving the physical working environment; (5) instituting strongly enforced student discipline codes; (6) instituting eleven-month contracts to provide time for curriculum and professional development; (7) raising the expectations for teacher performance and establishing clear policies on institutional objectives and teacher responsibilities; (8) giving teachers more say in

decisions about instruction, such as developing curricula and selecting materials; (9) establishing objective evaluation procedures; (10) providing support teams to beginning teachers and thorough orientations on available resources; and (11) strengthening staff development and continuing education programs (58, 116, 117, 135, 139, 163, 169, 209, 211, 219).

Many proposals would offer undergraduate scholarships and fellowships in exchange for commitments to teach, or extended loans with forgiveness provisions tied to teaching commitments (105, 172, 205). These scholarship and loan programs are usually proposed to attract teachers into specific subject areas where there are serious shortages (4, 173, 192, 207, 208, 209, 211). A College Entrance Examination Board study of the National Defense Student Loan program, however, found no evidence that loan forgiveness contributed to an increase in the number or quality of teachers (66, 125). In any case, loan forgiveness is not an effective means for alleviating current shortages because of the long lead time needed to prepare teachers (182).

Many other methods for alleviating shortages in critical subject areas have been proposed. These include:

- raising salaries or offering one-time bonuses for teachers in shortage areas;
- reimbursing the cost of retraining existing teachers in shortage fields;
- encouraging qualified applicants to train for teaching, teach for several years (perhaps with summer jobs in private companies), and then take permanent positions in business or industry;
- promoting inservice programs to upgrade the skills of current teachers, particularly in mathematics and science;
- reallocating teacher education resources to high demand subject areas, since many programs overproduce in low demand areas; and
- modifying certification requirements in critical shortage areas to give provisional certification to people with backgrounds in those substantive areas but not in pedagogy, and providing supervision and continuing education until they qualify for full certification (4, 46, 58, 163, 173, 192, 195, 208, 209, 211, 224).

Conclusion

While there is an approximate balance in the total supply and demand for teachers at this time, a severe shortage looms in the next few years. Some localities and some subject areas are already experiencing serious teacher

shortages, which may intensify nationwide unless steps are taken to increase the production of new teachers. While the supply of new teachers has been decreasing since 1972, demand has begun to escalate as elementary school enrollments increase. In the early 1990s, the number of teacher retirements will also accelerate.

If the current decline in the supply of teachers is to be reversed, ways must be found to attract more students into teaching and keep them there. Many experts argue that the structure and conditions of teaching must change to make teaching a more attractive career--for both prospective and current teachers (78). Unless institutions of higher education produce sufficient numbers of qualified teachers, and states and school districts offer attractive incentives to teachers, current efforts to raise quality may fall by the wayside in a desperate attempt to keep classrooms staffed (78).

5. A Concluding Note

Teacher quality is the product of a number of factors; no one strategy will solve the problem. Many actors are involved in the process of setting standards, training teachers, and selecting them for employment--such as state boards of education, state education agencies, licensing and certification authorities, state legislatures, accrediting agencies, local school districts and their boards, individual schools, and schools of education. Solutions to the problem of teacher quality cannot be imposed by any one agent. The cooperation of many is required.

Perfect equilibrium in supply and demand is rare. Currently, we are entering a period of shortage in the supply of teachers. Any steps taken by states, school districts, and schools of education to raise standards for prospective teachers may increase the shortage, at least temporarily. Stricter standards will need to be complemented with incentives to make teaching a more attractive career. Yet, the effects of greater incentives in attracting more and higher quality students to teaching will not appear for several years.

A Gallup poll conducted in 1980 found that only 30 percent of adult Americans were willing to pay higher taxes in order to finance increases in teacher salaries (58). However, in 1983 another Gallup poll found that 58 percent were willing to pay more taxes to improve the public schools (23). This apparent reversal is an indication that the public is now ready to support incentives for better education.

Donna Kerr of the Institute for Advanced Study at Princeton stated the dilemma well. "There is a disturbing duplicity," she wrote, "in a society that itself fails to create the conditions that would foster teaching competence, and then complains of incompetent teachers. Our teaching corps can be no more competent than we make it" (58, p. 161).

Education policy makers at all levels must begin increasing standards and increasing incentives for quality teaching, while devising strategies to survive short-term shortages, or they will contribute to the further deterioration of the condition of education. Current trends and initiatives are encouraging, but it will take a concerted effort on a nationwide basis to regenerate overall teacher quality.

Appendix

Findings of Selected Major Task Forces and Commissions*

Making the Grade. Report of the Twentieth Century Fund Task Force on Federal Elementary and Secondary Education Policy	**High School: A Report on Secondary Education in America, by Ernest Boyer. Report of the Carnegie Foundation for the Advancement of Teaching**
Teacher Education	
Not discussed.	Both preservice and inservice training are inadequate. 1) Recommends a 5-year preservice program. 2) Recommends increasing admission requirements. 3) Notes the need to recruit better students through improved working conditions for teachers, special high school programs for gifted students interested in teaching, and scholarships for gifted students who wish to teach. 4) Recommends greater interaction with the public schools in developing preservice and inservice programs.
Teacher Quality	
Notes the deterioration in teacher quality and devaluation of teachers' status. Recommends a national Master Teachers Program, funded by the federal government, that recognizes and rewards teaching excellence. The Master Teachers Program is expected to lead the way for reconsideration of merit-based personnel systems, which will improve teacher quality.	Notes that instruction tends to be routine, and emphasizes the need to "renew" teaching through: 1) better working conditions; 2) support for innovative teaching practices; 3) greater rewards for outstanding teachers; 4) higher salaries; 5) better professional development activities; 6) a career ladder with less leveling off of salaries; 7) altering the inflexible structure of schooling; and 8) greater interaction with higher education and industry.
Supply/Demand	
Notes shortages of mathematics and science teachers in many districts. Recommends an incentive program to augment the supply of teachers in mathematics and science, e.g., federal loans with forgiveness of up to 10% of the amount of the loan for every year of teaching, up to 5 years.	Discussed only minimally. 1) Rejects the notion of differential pay for teachers in shortage areas such as mathematics and science. Instead, recommends hiring professionals to lecture on a part-time basis after brief orientation periods. 2) Recommends joint appointments with business and industry. 3) Recommends a National Teacher Service Corps.

*See Introduction for reference to other reports.

Appendix (continued)

Action for Excellence. Report of the Task Force on Education for Economic Growth, Education Commission of the States	A Nation at Risk: The Imperative for Educational Reform. Report by the National Commission on Excellence in Education
Teacher Education	
Both preservice and inservice training are inadequate. 1) Recommends restructuring, renewing, and upgrading the curricula for teacher training. 2) Recommends more summer institutes and college programs to upgrade the skills of existing teachers, especially in mathematics and science. 3) Recommends financial incentives such as scholarships to attract more able students into teacher education programs.	Teacher training programs need substantial improvement. 1) There is too much emphasis on educational methods and not enough on subject matter. 2) Not enough academically able students are being attracted into teacher education programs. Recommends financial incentives such as grants and loans to attract outstanding students. 3) Master teachers should be involved in designing teacher preparation programs.
Teacher Quality	
Notes deficiencies in teacher quality. 1) Recommends expressing a new and higher regard for teachers through higher pay, a career ladder, and new ways of honoring exceptional teachers. 2) Recommends better quality assurance through systems for measuring teacher effectiveness, rewarding outstanding performance, setting higher certification standards, and dismissing ineffective teachers.	1) Recommends higher pay for teachers, with salaries and promotions performance-based and tied to an effective evaluation system. Superior teachers should be rewarded and poor ones removed. 2) Recommends a career ladder for teachers. 3) Recommends an 11-month contract so teachers can have time for curriculum and professional development.
Supply/Demand	
Notes that there is a "teacher gap": not a shortage in sheer numbers, but a shortage of qualified teachers in critical subject areas such as mathematics and science. Recommends improving methods for recruiting teachers and increasing teacher pay to be competitive with industry.	There are severe shortages of qualified teachers in key fields such as mathematics and science. 1) Incentives such as grants and loans should be used to attract qualified persons into teaching. 2) Persons from nontraditional fields should also be used as teachers, such as industrial and retired scientists. 3) Existing teachers should be retrained in science centers.

Appendix (continued)

"A Study of Schooling in the United States." Study by John Goodlad and associates. Summarized in A Place Called School: Prospects for the Future	The Need for Quality and Meeting the Need for Quality: Action in the South. Reports prepared by the Southern Regional Education Board's Task Force on Higher Education and the Schools
Teacher Education	
A reconstruction of teacher education is long overdue. 1) Teacher education encourages a lack of variation in pedagogical alternatives. 2) Teacher education curricula should be revised in both depth and breadth to reflect the current educational knowledge base. 3) Recommends an internship or residency period in selected key schools working in collaboration with the university. The intern would follow a 2-year program of professional studies before being designated a "career teacher."	1) Each state should conduct ongoing evaluations of its teacher education programs. 2) Tighter selection procedures should be applied throughout the preparation process. 3) More and earlier field experience should be provided. 4) Arts and sciences departments should be involved in improving teacher preparation programs. 5) Loans and scholarships should be used to attract more able students into teaching. 6) Graduate education and inservice training should be more relevant to teachers' current assignments.
Teacher Quality	
1) There is little variation in the range of teaching procedures. The school environment must be changed to encourage alternative teaching methods. 2) Cautions against improving only those aspects of teaching believed to improve test scores. 3) Recommends a career ladder for teachers with a differentiated salary schedule.	1) Teacher salaries should be increased, and there should be additional financial rewards for outstanding teaching. 2) Recommends performance evaluation of all beginning teachers. 3) Recommends allowing arts and sciences graduates to obtain provisional teaching certificates. 4) Recommends a common teacher certification test.
Supply/Demand	
Notes that the period of oversupply in most fields is ending, and a period of undersupply is beginning. The shortage of mathematics and science teachers is already critical. A teacher shortage means that quality may be sacrificed in order to increase the supply of teachers.	1) There will be a general shortage of teachers by the mid-eighties, which will make it difficult to maintain quality. 2) There are already critical shortages in mathematics and science. Recommends financial incentives to attract mathematics and science majors into teaching. Also, universities and private industry should share their professional personnel with the schools.

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